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IS 1448-99 (1981): Methods of Test for Petroleum and Its Products, Part 99: Determination of Frothing Characteristics of Emulsifiable Cutting Oils [PCD 1: Methods of Measurement and Test for Petroleum, Petroleum Products and Lubricants]

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**IS : 1448 [ P : 99 ] - 1981**
*Adopted : 5 January 1981*

REAFFIRMED
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# *Indian Standard*

# METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS

## [ P : 99 ]

## DETERMINATION OF FROTHING CHARACTERISTICS OF EMULSIFIABLE CUTTING OILS

UDC 621·892·6 : 532·694·1

( First Reprint NOVEMBER 1991 )

*Adapted from Institute of Petroleum, UK Standard No. IP 312/74*

## 1. SCOPE

**1.1** This method assesses the frothing characteristics of cutting oils used in the form of aqueous emulsions.

## 2. OUTLINE OF THE METHOD

**2.1** An aqueous emulsion of the oil is shaken in a measuring cylinder and the volume of froth is recorded after a specified time.

## 3. APPARATUS

**3.1 Magnetic Stirrer** — with glass or polyethylene jacketed soft iron stirring rod approximately 25 mm long × 6 mm diameter.

**3.2 Hypodermic Syringes** — ( without needles ) of suitable capacity.

**3.3 Measuring Cylinder** — graduated, stoppered, of 250 ml capacity.

**3.4 Flask** — of 150 ml capacity with 10 ml graduated neck having 0·1 ml graduation.

## 4. MATERIALS

**4.1 Synthetic Hard Water** — a calcium sulphate solution of total hardness equivalent to 200 ± 10 ppm in terms of calcium carbonate

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( $CaCO_3$ ). Prepare by dissolving 0·344 g calcium sulphate ( $CaSO_4$, $2H_2O$ ) per litre of distilled water. Determine the total hardness ( and adjust if necessary ) by the method described in Apppendix A of IS : 1448 [ P : 98 ]-1981*.

## 5. PREPARATION OF APPARATUS

**5.1** Clean the measuring cylinders and then treat them with chromic acid cleaning solution for at least 2 h. Rinse free from acid with tap water, then several times with distilled water, and dry.

> **Caution** — Protective clothing, including eye/face shield, should be worn when chromic acid is handled. Splashes on the skin should be immediately and thoroughly washed with water.

## 6. PROCEDURE

**6.1** Test the oil in duplicate, using preferably the water and the dilution which apply in practice, or failing this use synthetic hard water at an appropriate dilution.

**6.2** Prepare separate amounts of emulsion ( *see* **6.2.2** ) each sufficient to fill the graduated flask to the upper mark ( *see* Note ) as follows.

**6.2.1** Bring the water and the oil to a temperature of 20 ± 4°C before test.

**6.2.2** Stir the appropriate volume of water in a 500 ml conical flask, using the magnetic stirrer, at a speed sufficient to create a vortex just deep enough to reach the bottom of the flask. Add the requisite volume of oil quickly from a hypodermic syringe ( without needle ) of appropriate capacity and continue stirring for 2 minutes after the last drop of oil is added.

NOTE — Enough emulsion shall be prepared to fill the flask to the top mark. Suggested quantities for a selection of water: oil ratios are tabled below:

| | EMULSION RATIO | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 5 : 1 | 10 : 1 | 15 : 1 | 20 : 1 | 25 : 1 | 30 : 1 | 50 : 1 | 80 : 1 |
| Test water, ml | 150 | 200 | 180 | 200 | 200 | 180 | 200 | 240 |
| Oil, ml | 30 | 20 | 12 | 10 | 8 | 6 | 4 | 3 |

**6.3** At once pour 100 ml of the emulsion into the measuring cylinder, stopper and shake vigorously for 15 seconds.

**6.4** After shaking, stand the cylinder in a vertical position and immediately read the volume of froth. Make further readings at intervals of 5, 10 and 15 minutes.

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*Methods of test for petroleum and its products: Determination of emulsion stability of emulsifiable cutting oils.

## 7. REPORT

**7.1** Report the duplicate volumes of froth at 0, 5, 10 and 15 minutes to the nearest 2 ml as frothing characteristics.

## 8. PRECISION

**8.1** The precision of this method has not yet been established.

# AMENDMENT NO. 1 NOVEMBER 1993
# TO
# IS 1448 [ P:99 ] : 1981 METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS

## DETERMINATION OF FROTHING CHARACTERISTICS OF EMULSIFIABLE CUTTING OILS

( *Page* 1, *clause* 1.1 ) — Add the following after 1.1:

'**1.2** This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.'

( *Page* 2, *clause* 5.1, '*Caution*') — Read the following in place of the existing:

'PRECAUTIONARY STATEMENTS
**Chromic Acid Cleaning Solution**

**Danger** — Causes severe burns. A recognized carcinogen.

Stray oxidizer — Contact with other material may cause fire.

Hygroscopic.

Do not get into eyes, on skin, on clothing.

Avoid breathing vapour of mist.

Keep containers closed.

Use with adequate ventilation.

Do not take internally.

Wash thoroughly after handling.'

( PCD 01 )

Reprography Unit, BIS, New Delhi, India